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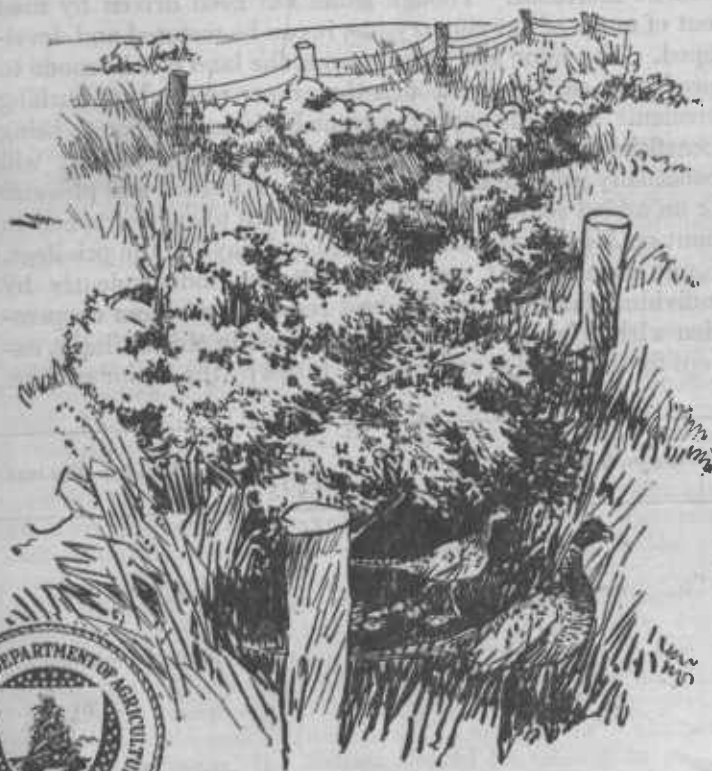
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GAME MANAGEMENT
ON THE
FARM



GAME MANAGEMENT ON THE FARM

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INTRODUCTION

GAME MANAGEMENT makes it possible for the farmer or landowner to increase the number of game birds and mammals on his property and by so doing to produce benefits and realize profits that will reward his efforts. The conservationist will encourage game management and the hunter will pay for it, and besides it is sensible practice for the farmer. It is in effect simply good land management by means of which a game crop is added to the crops already produced on the farm.

Game birds are among the natural aids of the crop grower, as they consume cutworms, grasshoppers, caterpillars, and other destructive insect pests, as well as weed seeds. In addition to these benefits from the mere presence of the birds, an annual game crop can be harvested from their increase. If by planning, a property owner can combine on his land game production with crop production, and at the same time control erosion, he is only doing what any good farmer ought to do to get the best use from his acreage. Game management is in line with all three of these objectives and with the present common-sense trend of studying land types and producing on them the crops to which they are best suited.

A good population of native game birds well managed will, in addition to being beneficial because of their food habits, eventually reach sufficient numbers to allow the farmer to take the surplus. This he can use either for his own food and pleasure or as a means of increasing farm revenue by charging hunters for the privilege of hunting on his well-stocked premises. Where game is abundant and encouraged to increase, the hunter should be willing to pay for the privilege of hunting.

In experimental areas on which game management has been applied, the nuisance of game poaching by unwelcome and unbidden

hunters has been reduced, cordial relationships have been established between landowner and hunter, and the value of the farm land has increased, as have also the income from the land as a whole, State hunting-license receipts, and, to some extent, taxable values.

One farmer can undertake game management alone and benefit from it, but the best results are obtained when several neighboring farmers join together in a cooperative effort on 1,000- to 3,000-acre tracts.

Open game country and free public shooting grounds are almost a thing of the past in many States, and it is beyond the realm of present-day possibilities for State game commissions to purchase and maintain public shooting grounds sufficient to supply the demands of all the sportsmen.

Therefore, if small game is to be hunted and shot by the sportsman, it must be produced by the landowner, and the sportsman must

adjust himself to the new conditions. He must be reconciled to the fact that if game is to be produced for his recreation, the farmer who produces that game is entitled to a just remuneration for the product, for the use of his land, and for his services. The sportsman will learn also that only under such conditions can he be assured of the perpetuation of hunting and of game in sufficient abundance to maintain the attractiveness of the sport. For a realization of these objectives game management is essential.



FIGURE 1.—Eroding hillsides. The waste of soil is hastened by pasturing livestock on such vegetation as can grow under unchecked conditions.

GAME MANAGEMENT NOT A COMPLICATED PRACTICE

A game crop is not and should not be dependent on an expensive artificial-brooder outfit. With very little encouragement game birds will multiply on an area devoted to their use if the natural surroundings are suitable for their propagation. This means that game birds may be increased in numbers by leaving for them small spots of ground in a natural state. Suitable small spots useless for general agricultural purposes are present on nearly every farm.

Few farms are entirely free from ditches, eroding hillsides, rough land, or brush patches where game food and cover can be provided. These waste spots are usually made worse by pasturing on them cattle, sheep, or hogs as the livestock devour or trample such vegeta-

tion as may be left, while benefiting very little. If those same spots of vegetation were left to nature they would serve as cover and food patches for game. It would be better yet if they were planned and planted for game use (figs. 1 and 2).

In some instances letting these waste lands grow up into natural vegetation is enough—the natural environment of game is restored, and the spread of erosion to the still-valuable fields and pasture lands is stopped. A little timely aid on the part of the landowner in seeding and planting these waste spots with quick-growing plants and trees that will furnish game cover, game food, and erosion control will greatly hasten the benefits to the farmer at small cost.

A little attention paid to the common feeding, wintering, and nesting habits of game birds will guide one in the proper development of these natural areas and increase the chances that game will actually occupy them.

ASSISTANCE AVAILABLE

Advice and help in the business of planning one's land can be obtained from a number of sources. County agents in many agricultural sections are glad to assist in just such planning, not only for game production but for the use of land for crops. Most States have game technicians on the field staff of the State game commissions, men who can be called in to advise as to the kind of game best suited to the property and who will welcome the opportunity to aid the land-

owner. Few State game commissions are likely to ignore a request for assistance in planning the game program on a farm. Local game wardens and conservation officers also are in a position to give assistance. The Federal Bureau of Biological Survey can furnish information through its research workers and regional officers in game management and has recently established in a number of States cooperative wildlife research stations where such help can be obtained (p. 22). Farmers living near erosion-control demonstration projects or C. C. C. camps of the Soil Conservation Service will find the technical staff of that Service always ready to aid in the solution of their problems.



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FIGURE 2.—View of what could be done with the eroding hillsides shown in figure 1. Soil is conserved by suitable plantings; cattle, sheep, and hogs are fenced out. In the resulting cover, game finds suitable habitat for nesting and feeding.

MAKING GAME MANAGEMENT FIT THE LAND

There is probably no land that cannot be brought into game production if enough time and money are spent on it; but the average farmer must keep such expenditure within practical limits. Moreover, any plan for game management for the average farm must take into consideration the cropping systems and must be coordinated with practical farming operations.

Though it will be found helpful actually to draw out a plan on paper and to measure out and plat the farm area suitable for game management, it is not always necessary to do so. Each landowner is usually well acquainted with his farm, and if he knows the principles to follow he can do a pretty good job of building up game cover without a map or chart. The success of any such program depends, however, on the extent to which an area under game management can be made to reach its maximum in game population. To accomplish this, it will be found well worth the extra time and effort put forth in charting each individual farm included in a game-management area.

Charting a farm for game management includes noting all fence corners, abandoned roads, erosion areas, springs, water holes or creeks, ditches, underbrush, orchards, wood lots or forested areas, and waste lands, and the general uses to which the farm fields are put; that is, to pasture, clover, hay, grains, feed lots, garden vegetables, etc. Having such a chart at hand, a good game technician can with remarkable accuracy assist in estimating the number and kinds of game that can be produced on the area.

The work and expense involved in producing game will vary with the condition of the land one has at the start. Some land has a certain game foundation as it exists; other land has practically none. The first step in planning any building-up of the game crop will be to study all the existing possibilities and to build from them.

LANDS WITH A GAME FOUNDATION

Lands that have a foundation for game management are those on which certain natural elements already exist around which the improvement and development work can be built. These natural elements include ditches, creek beds, gullies, lake beds, marsh areas, fence-row thickets, patches of shrubbery, grapevines along fences, worked-out gravel pits, rough wood lots, old, unused roadways, odd corners cut off by roads or ditches, and ground difficult of access for pasture or farming. The presence of these usually waste areas has many advantages when it comes to undertaking game management.

The planting and the maintenance of grass, shrubbery, and herbaceous plants on gullies, steep hillsides, ditchbanks, and similar places aids the control of erosion and at the same time provides game cover and produces a winter food supply.

The plots desirable for the game crop are mostly waste lands of little use to the farm in their present state or areas on which conditions favorable to game can be produced without interfering with the present crops.

Additional plantings of trees and shrubs for cover and game food can be so planned that there will be valuable results both in game cover and soil conservation.

Wood lots and orchards can be studied for their game-producing qualities and then thinned out or added to as required to supply the necessary balance of food and cover.

There usually exists on or near waste land enough water to meet the demands of game, without making other provision to supply it; there is also opportunity to improve fishing conditions in any water improvement that may be undertaken on such areas for the sake of game.

LANDS THAT MUST BE STOCKED

A question that will naturally occur to the farmer who has only a light population of game on his land is this: "Where will the game come from to occupy these new environments?" Not infrequently a few pairs of birds or mammals already exist in the neighborhood, and by natural increase under the protected conditions these few will multiply and establish a family in each one of the new homes provided.

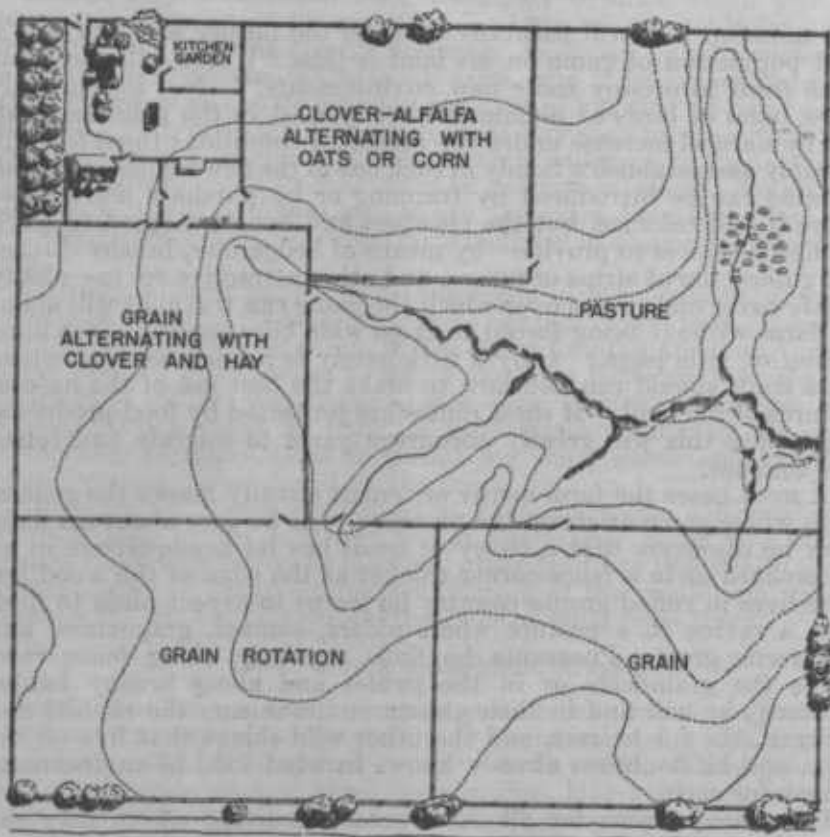
Game can be introduced by trapping or by purchase and release where it will colonize, but the cheapest and easiest method to stock the new homes is to provide—by means of hedgerows, brushy ditches and gullies, uncut strips of forage, and other attractive cover—plenty of safe cover and routes over which the game can travel at will about the farm without being forced to cross wide bare spaces. (See illustration on title page.) Only a little study is needed to show where these trails should run and how to make the best use of the natural features of the land. If these routes are protected by food-producing vegetation, this will greatly encourage game to migrate and found new colonies.

In most cases the farm owner or tenant already knows the general areas where game exists on the premises. As he goes about his daily work he discovers that a covey of quail has its headquarters in an old orchard or in a fence-corner thicket at the edge of the wood lot. If he lives in ruffed grouse country he learns to expect birds to flush from a ravine in a pasture where alders, sumacs, grapevines, and evergreens grow. Pheasants he finds regularly along fence rows beside the grainfields or in the swales and along brushy banks. Similarly, he will find in their chosen environments the rabbits and squirrels, the fur bearers, and the other wild things that live on the farm, and he doubtless already knows in what kind of environment to look for each.

There are reasons for all these creatures living where they do. They do not "just happen" to be where they are found, and it is not hard for the farmer to discover the conditions that hold the game in those favored spots. These conditions are invariably concerned with cover, food, and water, all so situated as to be available to the game the year round. Usually it is easy to improve the arrangement so that each of these areas will support more game. Similar environment also can be built elsewhere on the farm—in gullies, thickets, creek bottoms, wood lots, hedgerows, windbreaks, and similar spots—where before there has been no game because of lack of cover, food, water, or perhaps all these essentials (figs. 3 and 4).

Improvement of this kind for the conservation and increase of game may go hand in hand with conservation of the soil. In figure 3, for instance, in which levels on the sloping surfaces are indicated by dotted contour lines, it is much easier to plow, plant, and cultivate parallel with these lines, that is, on the level, or "on the contour", than

up and down hill. Furthermore, by such practice much less water is permitted to run off the land, each row and each plow furrow acting as a small terrace to hold water that otherwise would carry away valuable crop soil. Control of the upper parts of the farm through contour cultivation will mean that the lower gullies, as shown in the illustration, will not increase in size. Check dams and woody plants, as suggested in figure 4, will control even large gullies when proper farm practices are employed on adjacent and more elevated lands.



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FIGURE 3.—Lay-out of farm without game management or erosion control. Sloping is indicated by the dotted contour lines. By level cultivation along and parallel with these contours, soil is conserved and natural cover is left for game. The possibilities of such management for soil conservation and game propagation are shown in figure 4. (Drafted by Soil Conservation Service.)

It is advisable in game management, however, to add the knowledge of game experts to the observations of the farmer and to make certain that essential food supplies for the particular species of game desired are known and provided. When the landowner has completed his own observations it will be wise to call upon the State game commission for a check-up and further advice.

GAME, A NATURAL CROP

Before attempting to develop any plan for the increase of farm game and other valuable forms of native wildlife the landowner should rid himself of the impression that the work is going to be difficult or that it will require highly specialized knowledge. For ages past the land has produced wildlife naturally just as it has produced forests or grass or wild fruits. It will produce the same things again even in close

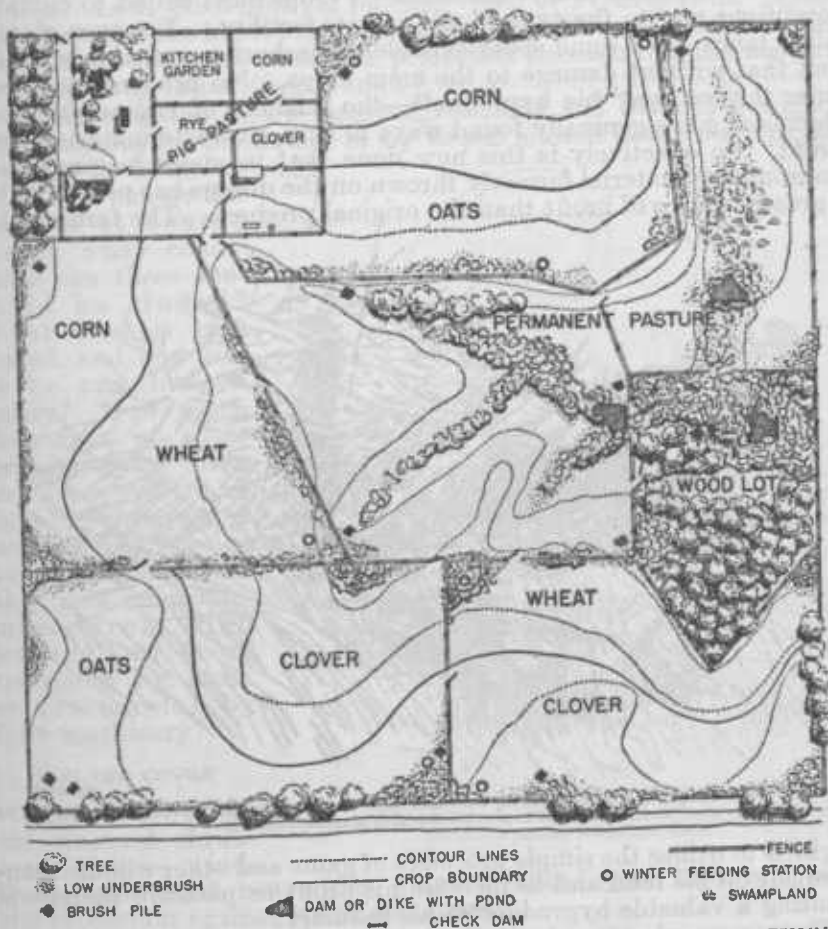


FIGURE 4.—Lay-out of farm shown in figure 3 after the adoption of game-management and erosion-control practices—new fence lines to protect gullies from overgrazing and erosion, brushy growths along fences, and cover on “game highways” under which birds can travel safely from one feeding ground to another. The field crops should be rotated—for example, oats on one side of a crop boundary one year, then clover, and the third year, corn, to be followed the next year by oats—a common 3-year rotation. (Drafted by Soil Conservation Service.)

proximity to civilization if it has the opportunity. When a farm is abandoned and nature resumes her domain, the land does not continue to grow crops of wheat, corn, cotton, beets, or tobacco. Instead, by slow processes it reverts to the production of the old wild crops of forest and prairie vegetation, and of game, fish, fur animals, birds, and other wildlife. Under the same conditions even the plants and ani-

mals that man has tamed and domesticated yield to the pressure of biological forces and slowly revert toward a wild condition, resuming their original habits and characteristics. Wildlife is one of the easiest of all crops to grow, because it is one of those that the land itself prefers to produce, so to speak, and would still be producing abundantly but for man's cultivation and interference in nature's original scheme.

Landowners are compelled by reasons of economy to devote their acres to the production of the domestic crops most suited to climatic conditions and to the type of soil and its fertility. Yet even closely tilled lands have some spots capable of harboring valuable wildlife, and that without damage to the main crops. No prudent manufacturer throws away his byproducts—the sciences of engineering and chemistry have generally found ways to turn all waste materials into profit. So effectively is this now done that in many instances the unpromising material formerly thrown on the dumps has proved to be a greater source of profit than the original product. The farmer who



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FIGURE 5.—A brush pile is a good home for bobwhite quail and other game. Frequently a tree can be lopped over to provide the basis of artificial shelter.

neglects to utilize the simple processes of game and other wildlife management on his land and to increase his profit or pleasure thereby is ignoring a valuable byproduct of his industry.

The revenue that may be realized from the farm supply of game, fur animals, or fish may even be relatively high in some cases. A large proportion of the money the farmer receives from the sale of wheat, corn, pork, and dairy and other products must go to pay the heavy costs of the labor, seed, and fertilizer used to produce the crop or product. On the other hand, the cash received for shooting or fishing privileges, while it may not be great in amount, or from harvesting the furs of skunks, muskrats, minks, foxes, or raccoons trapped on the farm, is nearly all clear profit, for the production of these crops has cost the landowner little in money or labor.

GAME COVER

Cover is perhaps the most important factor in game production, for without it wildlife cannot utilize the food and water supplies that may be present. Game cannot exist without concealing shelter and the protection afforded by cover against its predatory enemies, climatic extremes of heat and cold, flood, drought, snow, and severe storms. Cover may be any type of vegetation that affords such protection. Low, thick-growing bushes, vines, or rapid-growing perennial plants are the kinds most commonly available. Artificial shelter may also provide the minimum protection necessary in the absence of natural vegetation (figs. 5 and 6).

In planning the best arrangement of food and cover it is highly advantageous for the farmer to try to put himself in the place of the creature he is trying to aid. What are the enemies it fears? Under what conditions can these enemies be eluded? What food is preferred, and how can it be reached in safety? How much does lack of cover prevent game from moving about the farm? Where can it nest so that eggs or young will be reasonably safe from enemies, from high water, and from trampling by stock or destruction by farm machinery?

SHELTER COVER

Evergreen thickets, close-set shrubbery, hedges, windbreaks, and brush heaps



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FIGURE 6.—A brush heap, to which game birds have access, provides protection against storm and snow.

(figs. 5 and 6) afford game birds and rabbits protection against storm and snow.

NESTING COVER

Game birds need cover in which to conceal the nests and young. Quail, partridges, and pheasants will nest in the edges of fields of growing grain or grass, along grassy fence rows, in roadside thickets, and in the open, brushy margins of woodlands. Managing nesting cover will consist principally in protecting such places from grazing and in resisting the temptation to mow and trim or burn the weeds, grass, and undergrowth, at least until the rearing season is past. Trimness in roadsides and in field and swamp margins undoubtedly

adds to the appearance of a farm, but it is an expensive luxury when it drives game away from the farm and forces the song and insectivorous birds to move elsewhere to find more congenial quarters (figs. 7 and 8).

The best way to rid fence rows, roadside strips, and ditchbanks of noxious weeds is to crowd them out by planting wild berry bushes, plum thickets, sweetclover, lespedeza, bluegrass, and other vegetation that will also furnish food and cover for game and other birds.

LOCATION OF COVER

In planning the distribution of game coverts, attention should be given to accessibility to water and especially to food supplies. Where natural cover exists it is a simple matter to provide, nearby, a patch of food-bearing plants with stalks that will have sufficient height and

sturdiness to stand up and extend above the ordinary snows. Where abundant natural food is present it is necessary to see that near at hand there is cover and shelter to serve as a retreat for the game. A game expert can tell very closely how many game birds can subsist through the year on a farm by counting the coverts and noting the location and nature of food supplies.

FIELD CROPS AS NESTING COVER

The farmer who wishes to increase game will be confronted with the problem of how to avoid spoiling the nests or destroying the young of birds that nest



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FIGURE 7.—An exception to the rule of neatness—a brushy fence corner on the farm is a haven for ground nesting game.

in his grain and hay crops. Pheasants, quail, and partridges like such environment, and thousands of their nests are broken up each year by harvesting machinery that goes over the fields before the rearing season is over. It is not always possible to persuade the birds to abandon the dangerous practice of nesting in grain-fields and hayfields by providing more attractive cover nearby where they will not be interfered with by harvesting or planting operations. When the crops must be cut during the rearing season, some simple home-made device (fig. 9) can be used on the harvesting

machinery to flush the birds ahead of the cutter bar and give the driver a chance to avoid the nest or the young birds. A simple "flushing bar" fastened to tongue and neckyoke, and dangling knotted ropes, weighted burlap, or chains just ahead of the reaper knife will flush the game from the nests in time to allow the driver to lift the knife and leave unmolested an island of vegetation about the nest.

Once the mower knife, in passing over a nest of eggs, has cut away all the tall grass, hay, or grain that formerly hid them, the chances are small that the eggs will be hatched and the chicks brought to maturity. Game birds are likely to desert entirely a nest thus exposed. Crows and other egg-destroying and chick-eating predators find it easy to locate nests laid bare by the mowing machine or harvester. Farmers interested in having game on their lands will find the flushing bar simple and inexpensive to make and easy to operate. Its value will be shown by the increase in young birds produced.

EMERGENCY COVER

One type of cover still remains to be described. This is emergency cover, serving for harassed game in the same way that a dugout or bombproof does for soldiers under shell fire. The location of emergency cover has much to do with the ability of game to make use of available supplies of food and water. Game species are always subject to attack from the air and have learned that this danger is greatest in open fields devoid of concealing vegetation. However tempting may be a distant stubble field or a crop of millet with its promise of abundant food, game birds prefer starvation rations near the safety of the home thicket to a feast far out across those open, shelterless fields.

Experience has shown that quail can be brought into fields that are perfectly bare of cover by the simple expedient of building "safety zones" for them. This is done by setting up rough loose platforms of poles elevated 2 feet off the ground and piling brush over the frame (fig. 10). Loose construction allows the birds to hop up from the ground and hide in the tangled brush. The safety zone is even more



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FIGURE 8.—Clean cultivation and cleared fence corners—extreme neatness, but all game cover has been removed.

attractive when sweetlover or low, bushy shrubbery is allowed to grow for a few yards around the edges of the platform.

PLANNING GAME HIGHWAYS

As nearly as he can, the farmer must have what is literally a bird's-eye view of the farm environment. Seen thus, the brush-grown, vine-covered fences and weed-filled ditches become the safe highways along which game travels to reach food and water or to visit other colonies of its own kind (figs. 2 and 4). Ravines and eroded gullies serve the same purpose when their sides are covered with concealing growth. These gullies form a most important feature of the farm terrain. They are the wounds, small at first, through which the life blood of soil fertility will pour away unless erosion is stopped. Generally all that is needed in the early stages is to encourage the growth of vegetation along the sides

and bottoms of ravines and gullies that drain the overflow water from the land and to protect the vegetation from grazing by domestic livestock (figs. 11 and 12). The game that will be attracted by such game highways will more than pay for the loss of pasturage, and fertile soil and water will be saved.

THE HUNTER-FARMER PROBLEM

With few exceptions, the laws of the various States relating to the taking of fish, upland game, and furbearers are in a sense relics of the period when the State game



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FIGURE 9.—A burlap curtain with weights along the bottom, attached to a pole hung from the tongue and neckyoke, will flush nesting birds and warn the operator of the mower or harvester to raise the cutter bar in time to save both the nest and an island of protecting cover.

wardens were the sole custodians and guardians of wildlife. Then there were few private game preserves, few landowners were interested in maintaining game on their lands, few farms were posted against shooting and fishing, and free public shooting was general.

The game belonged to the State, and gunners sought it wherever they pleased. The genuine sportsmen gave consideration to the rights of the property owners on whose lands they hunted, but other gunners did not behave with equal courtesy. They left the farmer's gates open, tore down his fences, trampled his crops, shot his cattle, set fire to his wood lots. Though most of these outrages were the results of acts of sheer carelessness on the part of the gunners, some, unfortunately, were deliberate, and probably the landowner who protested was abused by his unwelcome guests. Rural neighborhoods

were overrun by gangs from cities and towns armed with guns or equipped with fishing tackle that they intended to use whether or no.

To such an extent was this carried on that the long-suffering farmers began at last to post their lands against trespass. Then the public awoke to the fact that even though the State owned the game the landowner controlled the taking of it. So rapidly is the posting movement progressing that within a very few years the total area of private lands upon which the public are free to shoot or fish will be small indeed. In most communities public shooting is already a thing of the past. It was not the gentleman sportman who drove the farmer to take refuge behind his "No shooting" sign; it was the careless, inconsiderate, or unscrupulous fellow who, rich or poor, is always to be found abusing whatever privileges are granted him.

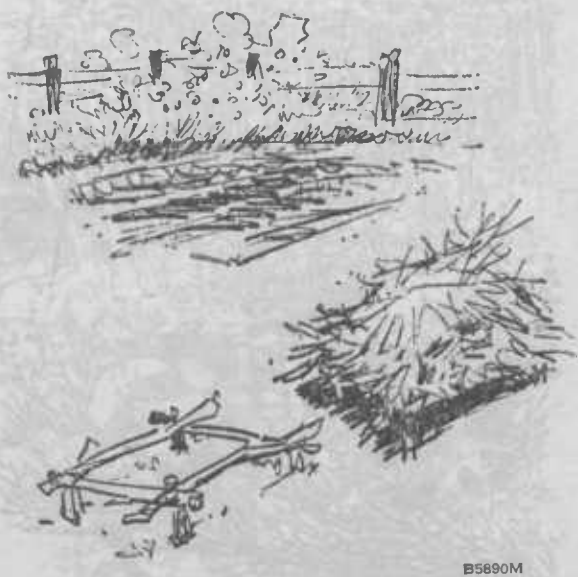
THE SOLUTION

The future of upland-game shooting is in the hands of three agencies: It depends upon the ability of landowners, of State game commissions, and of sportsmen to develop and maintain a system that will bring pronounced benefits to all. This profitable and pleasant alliance, which is the only solution of the existing upland-game problem, needs to receive every possible encouragement from the legislatures of the States.

THE FARMER

The farmer wants, first of all, protection from rowdiness and carelessness. He also wants the profit justly due him for the product his acres provide in game, fish, and fur, even though it costs him little to produce it. In most cases, he and his family will enjoy making new friends among sportsmen from the towns and cities. Such contacts are profitable and helpful in many ways, not only to the farm family but to their city friends as well (fig. 13).

Posting the farm against hunting, fishing, or trapping may help to keep careless strangers away, but it makes few friends and of itself does little or nothing to increase game on the average farm. On the other hand, the planned improvement of water, food, and cover will provide an annual crop, one that responsible sportsmen will pay well for the privilege of harvesting. Many a sportsman who



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FIGURE 10.—Brush heaps elevated 2 feet above the ground on loose platforms of poles provide winter shelter when other cover is absent and are of greatest service when near a food supply.

would not pay his dealer a dollar for a dead pheasant will pay much more than that for a chance to hunt the bird in its natural cover and shoot it on the wing if he can.

THE STATE GAME DEPARTMENT

The State game department's function in this cooperative system of upland shooting, in addition to that of enforcing the game laws as to seasons and bag limits, should be to furnish the farmer protection against poachers and gun-carrying hoodlums. Its game-management

agents can also assist the farmer by going over his ground and showing him how to build up food and cover so as to increase wildlife, conserve water supplies, and prevent soil erosion. The State can also conduct research activities and experimental projects to furnish the facts and information that will enable the landowner to produce his wildlife crops. It is hopeless to rely upon any State agency, no matter how liberal its funds, to produce game enough to use all available cover without the help of both sportsmen and landowners.

The State benefits

from this cooperative transaction by a general increase of game and valuable wildlife, by the resulting improvement in rural conditions, and by the greater income from the sale of shooting and fishing licenses.

THE SPORTSMAN

The sportsman's contribution to the arrangement, in addition to the payment of his license fee to the State, is a willingness to pay a fee to the landowner for producing the game and providing him with shooting grounds. In addition to making this cash contribution he should be courteous to the farmer and careful of the farmer's property. In return for these things he is given full range of a place where game is reasonably abundant and where as a welcome guest he is free to pursue his recreation without fear of offending a landowner.



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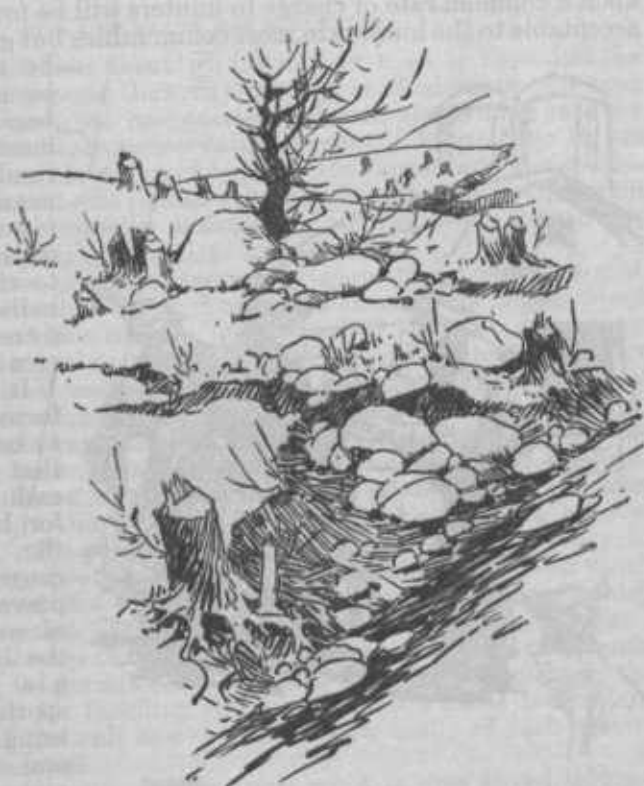
FIGURE 11.—Forested gullies, with check dams for erosion control, furnish attractive cover for game, and the slower run-off of shaded streams leaves pools in which fish can abound. Under such game management a veritable paradise is provided for wildlife, compared with the waste frequently seen. (See fig. 12.)

THE PROFIT FROM THE PRODUCT

It is not necessary to legalize the sale of dead game to enable the farmer to dispose of his surplus at a cash profit. Profits are higher when the game is "sold in front of the gun." In this country since the depletion of the great original stocks of game the supply for recreational purposes has never exceeded the demand. In all probability it never will do so.

Farmers' Bulletin 1719, *Improving the Farm Environment for Wildlife*, which will be sent free as long as the supply lasts, if application is made to the United States Department of Agriculture, contains suggestions to the farmer not only on details of food and cover management, but also on how to collect fees from his paying sportsmen guests, how to regulate shooting so as to conserve the breeding stock, and how to manage the shooting to the best advantage of all concerned.

It is essential to continued success that both the farmer who raises the game and the sportsman who buys from him the privilege of hunting it conduct their transactions on the principles of good business. The farmer should have no more hesitation in putting a cash price on his pheasants, quail, and rabbits than he does on his wheat, poultry, and butter. Some farmers are reluctant to charge a fee for the privilege of shooting over their land, feeling that it is inhospitable to do so. This they consider especially true if they happen to be acquainted with the gunners who visit them. In addition, though the intelligent sportsmen feel that their friend, the farmer, is entitled to recompense for the game he allows them to



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FIGURE 12.—Denuded slopes and unchecked stream flow leave a landscape barren of wildlife habitat and in dry seasons mere gullies without enough water for fish. Contrast with the same area under game management, figure 11.

take, they hesitate to offer money in payment for what the landowner may regard as an act of hospitality. Frequently the sportsman endeavors to show his appreciation by small gifts, as candy for the housewife and children or cigars for the farmer himself. Generally there is some such degree of embarrassment as must always result when valuable gifts are made to a recipient who is unable to balance favors.

FARMER COOPERATION

Concerted action by a group of neighboring farmers who enter into a game-management association and for mutual benefit agree upon a common rate of charge to hunters will be found not only to be acceptable to the hunters in most communities but greatly appreciated

by them as they will be more than paid back by the improvement in the hunting resulting from game-management practices. Furthermore, group agreements as to charges relieve the individual farmer of personal embarrassment.

It is far more satisfactory for all parties to have it understood that farm game is a cash crop to be paid for by the purchaser (fig. 13). This arrangement does not prevent an exchange of courtesies between the landowner and his guests. The sportman may still bring his small gifts and the farmer still make returns in items of similar value, if he wishes to do so, just



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FIGURE 13.—Game management can result in friendly relations between farmer and hunter.

as is frequently customary among business men. The farmer who has friends in the grocery or automobile business scarcely expects to be supplied with free groceries or automobiles, and his business acquaintances have no more reason to expect their farmer friend to present them with valuable products of his farm and industry, whether game or dairy products.

It will always be found highly advantageous, especially for the holders of small farms, to join with their neighbors in game-management projects. Each owner will then benefit from the efforts of the others, and the problems of stopping poaching, controlling natural enemies of game, and regulating shooting will all be easier to solve. Members of the group can cooperate also in arrangements for food

and cover crops along farm boundaries and for the management of these strips. Oftentimes when a considerable area is being managed for the production of game in this way it is possible to organize groups of sportsmen in nearby villages and cities who will rent the privileges season after season, thus assuring the landowners of permanent patronage and at the same time giving them opportunity to restrict their dealings to those customers whom they know to be honest, considerate, and conscientious.

There are several satisfactory methods by which the landowner and the sportsman can arrange such transactions.

HOW ONE STATE HAS SUCCEEDED

One game commission (that of Iowa) has tried a plan for the management of farm game that may be used in illustration of a type that provides for essential cooperation between the landowner, the sportsman, and the State conservation agency. In practice it has given good results and is endorsed both by the farmer and the sportsman. There seems to be no reason why this plan, or some modification of it, should not be equally satisfactory in any State where the necessary qualified game technicians are available.

Groups of farms are organized into game-management units. Experience indicates that for profitable and convenient management the units should seldom contain less than 600 acres or more than 3,500, though the actual area to be included must be determined after consideration of local conditions, type of land, and the number of landowners participating in the enterprise. When a unit has been established the State game department posts the combined properties and protects the area against poaching and unauthorized trespass. State game technicians inspect the unit and advise the landowners what to do for improving food and cover and for controlling natural enemies of game. They also indicate any other steps necessary to prepare the land to produce this crop without disturbing too much the regular work of the farm. The State may sometimes furnish eggs or game to restock areas that have no native breeding stocks.

When the time comes that there is a sufficient surplus of pheasants, quail, or rabbits to permit some shooting without diminishing the numbers necessary for breeding stocks, the State's game technicians make a survey of the unit and determine how many of each species may safely be taken off.

For example, game-management unit no. 3 is thus found to have 300 pheasants, 500 quail, and 800 rabbits as surplus over the numbers required to produce the next year's crop. The State game department then furnishes the farmers of their association with 300 pheasant tags, 500 quail tags, and 800 rabbit tags—each tag legalizing the taking and possession of one bird or other game animal, as specified. The farmers whose lands are within the unit either sell their own tags direct to the hunters or in some cases elect one of their number to act as their agent in all dealings with the sportsmen.

Some days before the shooting season opens, State agents post signs at suitable intervals along the highways and country roads directing sportsmen how to reach the farmer or his agent. On shooting days as the sportsmen arrive and are shown where to park their cars, each one purchases as many tags as he wishes, but not in excess of the daily bag limit allowed on any species by State law. One

sportsman perhaps does not want to shoot rabbits but would like to take his limit on quail and pheasants. He is given four pheasant tags and eight quail tags, paying perhaps 50 cents each for the pheasant tags and 25 cents for the quail. For rabbit tags he would pay, say 15 cents each. (The prices, of course, should be established in accordance with local conditions.) Someone else wants only rabbits, another wants some of all species, and so on.

The sportsman is given directions for finding his game and told where he will not interfere with the activities of other parties. He is also warned to look out for livestock or men in the fields and is told what crops to avoid and what other precautions to take. Either the farmers or the agent prevent overcrowding. This they may do by limiting the number of men admitted to the unit, or they may reserve the right to refuse to sell tags to an applicant whose actions show him to be careless or incompetent or whose reputation may be unsatisfactory. In short, the day's shooting is organized for the comfort, safety, and convenience of everyone concerned and is rescued from the old haphazard performance of the free-shooting days.

At the close of the day each gunner shows his bag of tagged game to the farmer or his agent and is reimbursed for any unused tags that he may turn in. The man who purchased four pheasant and eight quail tags may have been able to take only three pheasants and six quail. He, therefore, receives a cash rebate of \$1. If, as has been extremely rare, some gunner has accidentally caused damage to property by fire or by shooting, all the facts are readily known, and action may be taken to collect from the individuals responsible, if they themselves show no disposition voluntarily to make good.

When the supply of tags issued for the season is exhausted, the shooting season on that unit is closed, and the direction signs along the roads are removed. Then the State's game technicians go over the area to observe the results of the shooting and to advise the landowners how to carry their stocks of game through the winter. If there is not a sufficient supply of natural food, feeding must be resorted to, and the technician gives instructions as to where food should be placed and in what quantity and variety.

CONDITIONS IN OTHER STATES

In certain other States direct leasing of hunting rights is practiced with fair results. In some cases the State game authority is the lessee and opens the property to some sort of regulated public shooting. In others one or more sportsmen lease the hunting privileges for themselves and their guests. Individual landowners or groups of owners in some instances develop the game resources and allow hunting for a fixed price per hunt or per day. In these plans the landowners themselves limit the bag by allowing only enough hunting to remove the surplus.

All these plans have been successful in varying degrees. As one or another may be put into effect in one or more States, the landowners will do well to consult their State game authorities before attempting to adopt any one program. Some States have laws that may prevent particular practices, and in all cases the game authorities will be able to give helpful advice.

APPLICATION OF MANAGEMENT PRINCIPLES

An outline of the general principles and the advantages of game management on the farm has been given in the preceding pages. The actual steps in putting a game-management plan into effect must begin with a survey of the farm in which special attention is given to the following features.

FARM SURVEYS

Note the areas in each crop—corn, cotton, small grain, pasture, etc.

Note particularly such noncrop areas as fence corners, steep slopes, gullies, ditches, spots too wet to cultivate, brush patches, hedges, groves, etc. It is these elements that will figure largely in a game-management plan of the area and determine the plan as well as the type of game for which the land is suited.

Note carefully the relation of winter cover and food to each other. On the average farm, insects, succulents, and seeds furnish an abundance of food in summer, and at that season growing vegetation furnishes plenty of cover. Look at the area under winter conditions and develop the plan with a view to meeting the minimum requirements at that season.

Note the abundance of waste grain, weed seeds, dried vegetation, and fruits of numerous shrubs and trees that can provide winter foods. In snow country, food-bearing plants should be sturdy enough to stand above the snow and carry a load of food where it is available during the worst weather.

Locate such natural winter cover as evergreen thickets, blackberry tangles, rose thickets, hedges and thick growths of other shrubs that provide shelter from predators and weather. For maximum benefits it is important that such cover and winter food supplies be close together. The winter food must be adjacent to cover if it is to be available when the game needs it most.

PERMANENT COVER ON NONCROP LAND

Next, having in mind what has been learned regarding available winter food and shelter, examine the farm survey—better still, make a rough map of the farm, with the crop and waste areas indicated, and spot cover plantings where they can be out of the way of regular farming operations but adjacent to food supplies (fig. 4). These cover plantings may be in fence corners, along the fence itself, on a steep slope difficult to farm, along creekbanks and ditchbanks, or in other places where they will offer a minimum of interference to the regular farming operations. Examples are given as follows:

A small patch of shrubbery in a fence corner may make adjoining parts of several fields all containing winter food useful to a covey of quail, where before there was no chance for these birds to live through the winter (figs. 2, 4, and 7).

Plantings of shrubs or perennials along eroded channels (fig. 1) may help to prevent the loss of more fertile soil, aid in natural fertilizing, and at the same time furnish food and cover for game in a section previously entirely uninhabitable for such animals. Use native or other plant material known to be adapted to the local climatic conditions, and, where possible, select plants that also produce additional food supplies.

Steep-slope plantings of grass, shrubs, or trees may serve a similar double purpose (fig. 11).

Examine the farm to see if it is not possible to fence stock out of the wood lot or the small growth of timber along a creek bottom without too much interference with the farm program. The natural growth of ground vegetation in unpastured woodland makes game food and cover that may far exceed in value the small acreage previously used as pasture.

Consider whether it is possible to let some of the boundary fences grow up to bushes and perennials (fig. 7). The old rail fences, with their accompanying growth of vegetation, afford shelter and food for a wealth of insect-eating birds as well as safe avenues from which both game animals and birds may venture out into territory otherwise closed to them.

PERMANENT FOOD PATCHES ON CULTIVATED LAND

Study the farm program of crop rotation to see to what extent it will be possible to have small food patches adjacent to both natural cover and artificial shelters. Food may be waste grain or a small



FIGURE 14.—Corn left standing in a few shocks will frequently carry game over a hard winter. This phase of game management will sometimes return more to the farmer than the corn would have brought as a cash crop.

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bit of a crop left standing, such as a small patch of corn, the berries or fruits of shrubs forming the shelter, or such grains as lespedeza or buckwheat, or a mixture of grains planted purposely for the game (fig. 14).

TEMPORARY FOOD AND COVER

If it is not possible to plant permanent cover adjoining or within valuable feeding areas without interfering with farming operations, make temporary ones that will be useful through the winter by using corn shocks, brush piles, or other shelter, similar to those illustrated in figures 5, 6, and 14. The following are examples:

Brush can be piled on a loose platform of poles 2 feet from the ground (fig. 10). Quail will quickly learn to hop up into such a shelter and be safe from ground predators. For rabbits the brush pile should be either on the ground or much closer to it.

Corn shocks may be left open at the base to allow game to enter for shelter (fig. 14). In artificial shelters the openings should be on the side away from the direction of the most severe storms.

Game naturally takes advantage of the most meager shelter, such as a roll of wire or a piece of farm machinery left standing in a fence corner. From materials at hand any farm boy can devise accept-

able shelters that will be quickly utilized by game birds or animals in the absence of suitable natural cover (fig. 5).

ADVICE AND PLANS

After carefully considering the foregoing points, consult the county agent, the State game commission, or officials at one of the cooperative wildlife research stations listed on page 22 of this bulletin. The county agent can assist in selecting shrubs and plants that will be most likely to succeed in the locality; and the State game organization or the wildlife research unit can help not only in this respect but in suggesting profitable alterations in or additions to the plan. If, for instance, it is desired to develop fur animals, it is best to consult the above agencies (1) as to suitability of the farm for such purpose, and (2) as to methods for encouraging the species desired.

Do all necessary planting, fencing, shelter building, water development (if needed), and other work according to plans. The operations should not be expensive, particularly if local materials are used.

STOCKING

If no wild stock exists on the property, consult the State game commission as to methods of stocking. Usually enough quail, pheasants, rabbits, or other species remain in the country to occupy favorable spots developed for their use, without other special encouragement. As game stocks are built up, work out with the commission methods of harvesting surpluses that will leave adequate breeding stocks for producing the next year's crop. These methods must conform with State laws.

CONTROL OF ENEMIES

Study the relation of the predators to game stocks where an abundance of food exists close to abundant cover. Game species in suitable environment can usually care for themselves against hawks, owls, or other birds of prey. Other predators, particularly stray cats, house rats, and wide-ranging dogs, furnish a constant hazard that may need to be controlled as game population increases. Consult technicians of your State game department or regional or State officers of the Bureau of Biological Survey as to methods.

Not all the hawks and owls that are to be seen about the farm premises are enemies of either game or domestic poultry. Some of them are really "self-setting traps" that are always ready to kill rats and mice and other destructive rodents. The game farmer who shoots one of these birds has accomplished nothing but the destruction of a hard-working friend and cooperator. But while care and discrimination should be exercised in campaigns against hawks and owls and some of the fur bearers, the wandering house cat and the rat must be looked upon as constant enemies of small game and birds and should be destroyed, the rat at every opportunity and the cat whenever, venturing beyond the immediate vicinity of the farm buildings, it shows a tendency to prey upon game and other useful forms of wildlife.

One reason for the steady decrease of small game mammals and birds in rural sections is to be found in the fact that, every one of the estimated 100,000,000 uncontrolled house cats in this country kills a few birds each season; most of them, a great many.

While it is always desirable to prevent the number of predators from growing beyond a natural balance, the best possible predator control is to provide adequate cover in which game can protect itself from its enemies and to see that man, by his carelessness of game requirements, does not become the greatest predator of all.

WILDLIFE RESEARCH AND DEMONSTRATION STATIONS

Cooperative wildlife research and demonstration stations in certain States, established as a result of working agreements between the American Wildlife Institute, State game commissions, land-grant colleges, and the Bureau of Biological Survey, have as their purpose the furthering of basic research on wildlife problems and the application to practical problems of the information obtained through the establishment of demonstration-management areas. Address:

Cooperative wildlife research and demonstration stations at—

University of Maine, Orono, Maine.
 Connecticut State College, Storrs, Conn.
 Ohio State University, Columbus, Ohio.
 Virginia Polytechnic Institute, Blacksburg, Va.
 Alabama Polytechnic Institute, Auburn, Ala.
 Agricultural and Mechanical College of Texas, College Station, Tex.
 Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa.
 Utah State Agricultural College, Logan, Utah.
 Oregon State Agricultural College, Corvallis, Oreg.

ADDRESSES OF STATE GAME AGENCIES

Alabama: Department of Game, Fish, and Seafoods, Montgomery.	Nevada: Secretary of State Fish and Game Commission, Reno.
Alaska: Executive Officer, Alaska Game Commission, Juneau.	New Hampshire: Fish and Game Commissioner, Concord.
Arizona: State Game Warden, Phoenix.	New Jersey: Secretary of Board of Fish and Game Commissioners, Trenton.
Arkansas: Secretary, Game and Fish Commission, Little Rock.	New Mexico: State Game and Fish Warden, Santa Fe.
California: Executive Officer, Fish and Game Commission, 450 McAllister Street, San Francisco.	New York: Director of Fisheries and Game, Conservation Department, Albany.
Colorado: State Game and Fish Commissioner, Denver.	North Carolina: Commissioner of Game and Inland Fisheries, Department of Conservation and Development, Raleigh.
Connecticut: Superintendent of Fisheries and Game, Hartford.	North Dakota: Game and Fish Commissioner, Bismarck.
Delaware: Chief Game and Fish Warden, Dover.	Ohio: Commissioner of Conservation, Columbus.
Florida: Commission of Game and Fresh Water Fish, Tallahassee.	Oklahoma: State Fish and Game Warden, Oklahoma City.
Georgia: Game and Fish Commissioner, Atlanta.	Oregon: State Game Commissioner, 616 Oregon Building, Portland.
Idaho: Fish and Game Warden, Boise.	Pennsylvania: Executive Secretary, Board of Game Commissioners, Harrisburg.
Illinois: Director, Department of Conservation, Springfield.	Rhode Island: Chief, Division of Fish and Game, Department of Agriculture and Conservation, Providence.
Indiana: Director of Game and Fish, Conservation Department, State House, Indianapolis.	South Carolina: Chief Game Warden, Columbia.
Iowa: Director, State Conservation Commission, Des Moines.	South Dakota: Director, Division of Game and Fish, Department of Agriculture, Pierre.
Kansas: State Fish and Game Warden, Pratt.	Tennessee: Director, Board of Conservation for Game, Fish, and Wildlife, Nashville.
Kentucky: Game and Fish Commission, Frankfort.	Texas: Executive Officer, Game, Fish, and Oyster Commission, Austin.
Louisiana: Commissioner of Conservation, Court Building, New Orleans.	Utah: Fish and Game Commissioner, Salt Lake City.
Maine: Commissioner of Inland Fisheries and Game, State House, Augusta.	Vermont: Director, Fish and Game Service, Montpelier.
Maryland: State Game Warden, 512 Munsey Building, Baltimore.	Virginia: Executive Secretary, Commission of Game and Inland Fisheries, Richmond.
Massachusetts: Director, Division of Fisheries and Game, 20 Somerset Street, Boston.	Washington: Director of Game, 401-412 Lloyd Building, Seattle.
Michigan: Director, Commission of Conservation, Lansing.	West Virginia: Director of Conservation, Charleston.
Minnesota: Commissioner, Department of Conservation, St. Paul.	Wisconsin: Conservation Director, Madison.
Mississippi: Director of Conservation, State Game and Fish Commission, Jackson.	Wyoming: State Game and Fish Commission, Cheyenne.
Missouri: Game and Fish Commissioner, Jefferson City.	
Montana: State Fish and Game Warden, Helena.	
Nebraska: State Game Warden, Lincoln.	